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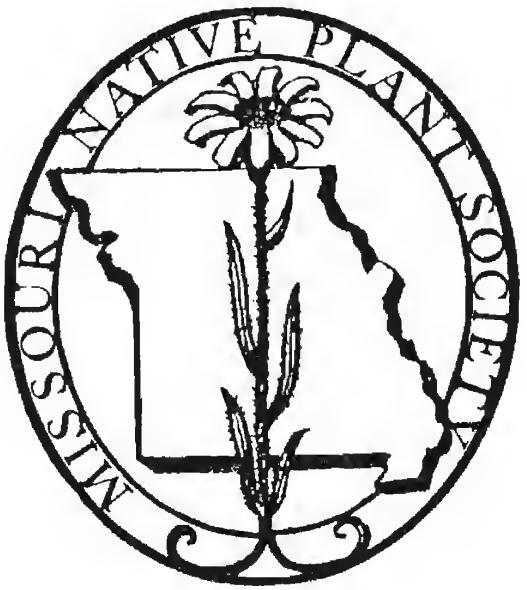

JOURNAL OF THE

MISSOURI NATIVE PLANT SOCIETY

PUBLISHED FOR THE SOCIETY
AT
SOUTHWEST MISSOURI STATE UNIVERSITY, SPRINGFIELD

Missouriensis is the official publication of the Missouri Native Plant Society. Founded in 1979 as a non-profit corporation, the Society is devoted to the conservation and study of the plants growing wild in Missouri, to the education of the public about the significance of the native flora and its habitat, and to the publication of related information.

INDEX

Letter from the Editor . . . . . p. 104
by Nancy Morin

News and Notes . . . . . p. 105

Minutes of the Spring Board Meeting . . . . . p. 106
by Karen Haller

Notes on some Rare/Endangered Howell and Douglas County Plants . . . . . p. 108
by Steve Orzell and Mervin Wallace

New Record for Barren Strawberry, Waldsteinia fragarioides (Michx.) Tratt. . . . . p. 110
by Steve Orzell and Mervin Wallace

Additions to the Flora of Missouri from Europe . . . . . p. 111
by David Castaner

Natural Area Inventory and Floristic Analysis of Fens in Selected Southeastern Missouri Counties: Part I. . . . . p. 113
by Steve Orzell

Studies on the Fabricales, Part I. . . . . p. 120
by Ellen and Kenneth Lissant

Native Plant Society Membership Lists. . . . . p. 124

Letter from the Editor

The Missouri Native Plant Society is a society of people interested in the plants of Missouri. That interest may be aesthetic, scientific, recreational, or, more often, a combination of these. The society, because it is a unit, potentially may be instrumental in the collection and documentation of important information about Missouri plants, and it may influence legislative decisions that affect those plants. Missouriensis is one of the main ways that society members can communicate amongst themselves. The editorial committee and I hope to bring you articles that will inform you and make you even more interested in Missouri plants, no matter what your "angle" is. We also hope to encourage the members to communicate with each other; to be a vehicle for documentation of important data, such as new county records, about our native plants; and to unify the society so it can be effective in setting up programs of study or acting on conservation issues.

Our first effort toward increasing communication is to tell you who you are: this issue contains a directory of members that is arranged both alphabetically and by region. We hope that this will make it easier to form official chapters of MONPS or to arrange informal local field trips. We would like to publish biographical sketches of our more active members and accounts of what plant-lovers in various areas of Missouri are doing, all so you will know "who you are" better.

In the future, we will publish an updated directory of herbaria in Missouri so you will know who is doing research on Missouri plants and just what they are doing, and what resources are available to you. Occasional recent literature reviews will bring you up-to-date on what has been published elsewhere on Missouri plants.

I should tell you something about the current editorial staff, which we hope to expand with members from outside the Missouri Botanical Garden in the next few months. Marie Uehling, my co-editor, has a B.Sc. in botany from Miami University at Oxford Ohio. She has been on the staff at the Missouri Botanical Garden for the past two years. Marie did the lion's share of the work for organizing the MONPS meeting at Cuivre River State Park, too. Roy Cereau and Sue Taylor both joined the Missouri Botanical Garden staff with master's degrees in botany this past year. Roy comes from Michigan State University and Sue from California State University at Chico. Sue has been very active in floristic studies and rare plant surveys in California. I received a doctorate in botany at the University of California at Berkeley and am Administrative Curator at the Missouri Botanical Garden, where I also edit their scientific journal. I hope to involve several more interested members of the society in participating in some editorial capacity for Missouriensis.

Finally, let me say to the members that this is your journal. I hope you will contribute short articles, papers, comments, and suggestions for it generously!

-- Nancy Morin

News and Notes

Correction:

In the article entitled Dodecatheon amethystinum (Fassett) by Steve Orzell, Missouriensis 4(3): 80-84, on page 81, the 26th line should read Marion County, rather than Ralls County.

Travels

Our MONPS past president Paul Redfearn is visiting the People's Republic of China. He left in mid-September for several months' study at the Institute of Botany, Beijing (Peking).

Julian Steyermark, living permanently in Venezuela for the past 24 years, made a trip to the United States in August. The author of Flora of Missouri spent a few days in St. Louis at the Missouri Botanical Garden using the Herbarium. Although he has turned mostly to tropical botany, some of his comments on more temperate topics will appear in an upcoming edition of Missouriensis.

Release from "News from the Eastern Region Forest Service"

The Eastern Region Office of the Forest Service, U.S. Department of Agriculture, has relocated. Effective 20 June 1983, all correspondence should be addressed: Eastern Region, Forest Service, USDA, Henry S. Reuss Federal Plaza Suite 500, 310 W. Wisconsin Ave., Milwaukee, WI 53203. Agency telephone numbers will stay the same. The Information Office number is (414) 291-3693.

From "All Outdoors"

The newsletter of the Missouri Department of Conservation reports that the Conservation Commission will hold its regular monthly meeting October 21 at the Department of Conservation Headquarters in Jefferson City.

Commission meetings are open to the public, and anyone with business should contact Department Headquarters, Box 180, Jefferson City 65102, at least 10 days before the meeting.

Books Available

The Missouri Botanical Garden has a supply of the original Oxford University Press edition of V. H. Heywood's Flowering Plants of the World (1978, 335 pp.). This work provides synoptic descriptions and discussions of all the families of flowering plants, based on the scheme in Stebbins's Flowering Plants - Evolution above the Species Level (1974). Most families are elegantly illustrated, in color, and there is a map reflecting the world distribution of most. Copies are available for $20.55, postpaid. Paul Redfearn's Mosses of the Interior Highlands of North America (1972) has just been reprinted in an updated and corrected version and is available for $15.70, postpaid. The Garden also stocks other selected botanical titles, such as Steyermark's Flora of Missouri and Lawrence's Taxonomy of Vascular Plants. Send orders to or request a complete listing from Department Eleven, Missouri Botanical Garden, P. O. Box 299,

Minutes of the Board Meeting

MISSOURI NATIVE PLANT SOCIETY
Friday, April 22, 1983
Alley Springs Campground
Ozark National Scenic Riverway

CALL TO ORDER. The Board meeting is always open to any and all members who wish to attend. This particular Board meeting was "open" in more ways than one. It was held in an open-sided, very breezy pavillion. When President Paul Redfearn called the meeting to order at 8:50 p.m., it was to a group dressed in warm winter coats, raingear, and an assorted array of colorful gloves and hats.

ATTENDANCE. Board members present: Erna Eisendrath, Karen S. Haller, Robert Mohlenbrock, Paul Nelson, Otto Ohmart, Ken Olson, Paul Redfearn, and Jim Henry Wilson. Other members present: Larry Anthony, Adrienne & Paul Biesterfeldt, Dave Castaner, Arthur Christ, Mary & John L. Doggett, Harriet & Bob Engelmann, Doris Epstein, Carl Hauser, Brian Hoduski, Doris Meibaum, John Molyneaux, Bruce Palmer, Sandy Posen, Jay Raveill, Susan & Dick Russell, Stephen Snyder, Joanna Turner, and Mervin Wallace.

MINUTES. Minutes of the February meeting were approved as published in Missouriensis, which was being handed out at the time.

TREASURER'S REPORT. In the absence of John Karel, Paul Nelson reported $182.50 collected from membership dues and disbursements of $25.62, leaving the balance on hand at $3,094.16. Wally Weber reported over $200.00 worth of patches and decals sold by Karen Haller and himself thus far. More are available.

OLD BUSINESS.

Federated Garden Clubs of Missouri Workshops. Mervin Wallace relayed many thanks from Ginny to all who participated. Special thanks to Dr. Redfearn and Paul Nelson, as well as to Ginny Wallace, herself, who were featured on the April 18 program (as reported in the Winter 1983 Missouriensis). Four hundred and fifty (450) persons attended.

Elections. Nominations are now closed. Ballots are to be sent to members shortly. Rick Thom is serving as election judge.

Inventory. Chairman Paul Nelson has a computer print-out list of 50+ species added to Missouri since Steyermark. A copy of this will appear in the next issue of Missouriensis. Questions arose regarding the use of scientific names -- does one report according to the name used in Steyermark or by current nomenclature? Wally Weber suggested that our use of Steyermark maps would indicate usage of Steyermark names at present. Common names -- which one to use and whether all plants should have one (even if someone has to make one up) created some varied comments. No major decisions resulted.

NEW BUSINESS.

Missouriensis. Erna Eisendrath has resigned as Editor. Many thanks are expressed to her for the many years spent on a job well done. Nancy Morin has graciously consented to take over the job, beginning with the next issue.

Environmental Action. Irish Wilderness. Senators Jack Danforth and Thomas Eagleton introduced a new Irish bill in the Senate, S.64, in January. On March 17, Representatives Harold Volkmer, Bill Clay, and Alan Wheat introduced H.R.2170. To show MONPS support, President Redfearn will endorse a letter by Paul Nelson in this regard.

Mark Twain Forest Land Sale Proposal. It is suggested that individual members write to their congressman regarding this issue.

House Joint Resolution 21. This proposal to let Missouri voters pass on a one-tenth of one percent sales tax with the receipts to be divided between soil conservation and support for the state park system needs support from MONPS members. A telephone call or a letter to your senator will help.

Field Trips. April 23. Paul Redfearn distributed a multiple-page handout "Summary of the Plant Communities of the Ozark National Scenic Riverways" as a preliminary to Announcement of the Saturday field trips:

Spring Wild Flowers (Wallace Weber)
Vegetation of Shut-Ins (Paul Nelson)
Gravel Bar Succession (Grant Pyrah)
Upland Succession (Paul Redfearn)
Forest Trees (Bruce Palmer)
Departure times were set for 9:00 a.m. and 1:30 p.m.

OTHER. Request for Peplis diandra population locations from Dr. Peter Raven at the Missouri Botanical Garden. (Refer to page 72, Winter 1983 Missouriensis.)

Where Have All the Wildflowers Gone? by Robert Mohlenbroch has recently been published. Both book and author are to appear April 30 at the Museum of Science and Natural History in St. Louis.

ADJOURNMENT. All business completed, the meeting adjourned by 10:00 p.m.

EXTRA NOTE. As this is my last rendition of the minutes, I wish to thank all of you for giving me the opportunity to serve as your secretary these past two years.

Respectfully submitted,

Karen S. Haller
Secretary

Notes on Some Rare/Endangered Howell and Douglas County Plants

Steve L. Orzell[1] and Mervin Wallace[2]

During the second week of August 1983, both authors met to survey Howell County and a portion of Douglas County for rare plant taxa. The primary concerns were to (1) conduct a reconnaissance inventory of potential fens (calcareous wet meadows) in Howell County; (2) check the status of selected former Steyermark sinkhole ponds, swampy meadows, and upland meadows in Howell County; and (3) survey a potential relict site in Douglas County.

Four endangered taxa and one variety listed as possibly extirpated from Missouri are noted below (Missouri Department of Conservation, 1982). Specific site locations have been forwarded to the Missouri Department of Conservation. Voucher specimens are deposited at Missouri Botanical Garden. Nomenclature follows Steyermark (1963).

Echinodorus tenellus (Mart.) Buch. var. parvulus (Engelm.) Fassett.

This member of the Alismaceae was first collected in 1845 from sinkhole ponds north-northwest of St. Louis by Engelmann; all these localities have long since been destroyed (Steyermark, 1952 and 1963). Steyermark (1952) reported a new station from Adobesee Pond, which remained the only known extant population. This station was reported by Pryor (1980) to be heavily grazed. We discovered a new station at Myatt sinkhole pond just southwest of Adobesee Pond in Howell County. Hundreds of Echinodorus tenellus (Mart.) Buch. thrive in a drying but still moist sinkhole pond bed. Nearby associates included Cephalanthus occidentalis L., Diodia virginiana L., Ludwigia palustris (L.) Ell., Eryngium prostratum Nutt., Lysimachia nummularia L., and Eleocharis acicularis (L.) R. & S. The Adobesee Pond station needs to be verified. Echinodorus tenellus (Mart.) Buch. was listed as possibly extirpated (MDC, 1982). 10 August 1983, Orzell & Wallace #1143.

Eupatorium hyssopifolium L. var. calcaratum Fern. & Schub.

This member of the Compositae was reported by Steyermark (1953) from dry open places bordering Twin Ponds, with Ilex decidua Walt., Eryngium prostratum Nutt., Diodia virginiana L., and Pluchea foetida (L.) DC. Twin Ponds were described as bulldozed and deepened (Pryor, 1980). We located several plants of Eupatorium hyssopifolium L. from a semi-open dry-mesic upland forest bordering Twin Pond, in association with Quercus palustris Muenchh., Ilex decidua Walt., Rhus radicans L., Campsis radicans (L.) Seem., Ambrosia artemisiifolia L., and Panicum virgatum L. Plants of Eupatorium hyssopifolium L. were just barely starting to flower. It is listed as endangered (MDC, 1982). 10 August 1983, Orzell & Wallace #1139.

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[2]Mervin Wallace, Route 2, Jefferson City, Missouri 65101

Filipendula rubra (Hill) Robins.

Queen of the Prairie, a member of the Rosaceae, is listed as endangered (MDC, 1982) and occurs at two stations in St. Francois County, and two stations in Reynolds County (Orzell, 1982). A new station from Howell County was located where plants grew in a prairie fen with Andropogon gerardii Vitman, and Pycnanthemum virginianum (L.) Durand and Jackson. 8 August 1983, Orzell & Wallace, #1101.

Habenaria flava (L.) R. Br. var. flava

This variety is known only from Shannon, Wayne, and St. Clair Counties (Summers, 1981). We found thousands of flowering individuals in an unusually diverse area in Howell County that superficially resembles a wet-mesic prairie but is somewhat more floristically similar to wet meadows. Associates include Panicum scoparium Lam., Asclepias hirtella (Pennell) Woodson, Rhynchospora capitellata (Michx.) Vahl, Rhexia virginica L., and Liatris pycnostachya Michx. Habenaria flava var. flava is listed as endangered (MDC, 1982). 9 August 1983, Orzell & Wallace #1136.

Waldsteinia fragarioides (Michx.) Tratt.

This endangered member of the Rosaceae is recorded from Douglas, Dallas, and Texas Counties (Steyermark, 1963), and more recently from Shannon County by the authors. A new station in Douglas County was located along the lower third of a steep north-facing slope on Rippee Creek. Many extensive colonies occur above ledges of Roubidoux sandstone. Associates are Quercus rubra L., Acer saccharum (Michx.) Schott., Solidago arguta Ait., Cunila origanoides (L.) Britt., Aruncus dioicus (Walt.) Fern., Parthenocissus quinquefolia (L.) Planch, Rhus radicans L., Uvularia grandifolia Sm., and Asarum canadense L. Some colonies also occurred in association with Hydrangea arborescens L., Adiantum pedatum L., Cypripedium calceolus L., and the moss, Climacium americanum Brid. 11 August 1983, Orzell & Wallace, #1147.

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Missouri Department of Conservation. 1982. Rare and Endangered Species of Missouri. Draft Copy. Jefferson City, MO. 256 pp.

Orzell, S. L. 1982. Natural Area Inventory and Floristic Analysis of Fens in Selected Southeastern Missouri Counties. Master's Thesis. Southern Illinois University-Carbondale. 203 pp.

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Steyermark, J. A. 1952. "New Missouri Plant Records" (1949-1951). Rhodora 54: 250-260.

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Summers, J. W. 1981. Missouri Orchids. Natural History Series, No. 1. Missouri Dept. Conserv., Jefferson City, MO. 92 pp.

New Record for Barren Strawberry

Steve L. Orzell and Mervin Wallace

Barren Strawberry, Waldsteinia fragarioides (Michx.) Tratt., of the family Rosaceae, is listed as endangered in Missouri (Missouri Department of Conservation, 1982). The plant is reported in Steyermark (1963) from one station in Dallas County, two stations in Douglas County, and two stations in Texas County.

During a recent fen foray conducted by the authors, the junior author discovered a new station for W. fragarioides in Shannon County on 19 July 1983. The plants were abundant, forming numerous colonies along the lower slope of a wooden northeast-facing slope in a narrow steep-sided ravine developed in Eminence Dolomite (Upper Cambrian age). Nearby associates with W. fragarioides include Sugar Maple (Acer saccharum Marsh.), Red Oak (Quercus rubra L.), Carolina Buckthorn (Rhamnus caroliniana Walt.), Wild Hydrangea (Hydrangea arborescens L.), Blue Wood Aster (Aster cordifolius L.), Round-lobed Hepatica (Hepatica nobilis var. obtusa (Pursh.) Steyermark), Yellow Pimpernel (Taenidia integerrima (L.) Drude), and Black Cohosh (Cimicifuga racemosa (L.) Nutt.). W. fragarioides has a north-northeastern center of distribution. Isolated populations in Missouri most probably represent Appalachian disjunctions.

A voucher specimen has been deposited at the Missouri Botanical Garden (19 July 1983, Orzell & Wallace, #1306). The exact locality is not reported in this article; however, location data has been forwarded to the Natural History Section, Missouri Department of Conservation.

Literature Cited

Missouri Department of Conservation. 1982. Rare and Endangered Species of Missouri, Draft Copy. Jefferson City, Missouri. 256 pp.

Steyermark, J. A. 1963. Flora of Missouri. Iowa State University Press, Ames, Iowa. 1728 pp.

Additions to the Flora of Missouri From Europe

David Castaner[1]

This continues my series of reports on taxa new to Missouri from the herbarium at Central Missouri State University (designation WARM). It is hoped that these reports will enable those interested in Missouri plants to bring their lists up to date. In addition, in hopes that they will be useful, I have included short keys with each taxon to supplement the Flora of Missouri (Steyermark, 1963).

I would like to encourage those who have knowledge of new state records to report them in Missouriensis. Only in this way can we all know what is new to Missouri.

1. A New Bedstraw (Galium) to Missouri.

Galium divaricatum Poiret ex Lamarck is reported from Henry County, near Big Creek, about four miles southeast of Blairstown, along an abandoned railway bed (St. Louis and San Francisco Railway). The colony covered the entire width of the railway bed and was several meters long. No other colonies of this species were observed in the immediate area. A duplicate specimen has been examined by Lauramay T. Dempster of the Jepson Herbarium (Univ. of Cal., at Berkeley) and verified as this species.

This species has a rather wide distribution in North America: Ohio and West Virginia, south to Georgia, west to Arkansas, and in California and Oregon (C. A. Lawson, pers. comm., 1982). It is an adventive annual from Europe that is probably still spreading throughout the United States. In the Flora of Missouri this species will key to G. concinnum. The following key may be inserted on page 1389 of the Flora of Missouri to bring it up to date; in addition, it will summarize the differences between this species and G. concinnum.

k. Leaves sharply pointed or bristle-tipped; leaves always 6 or 5-7 ...k

kk. Leaves 1-2 cm long, with cuspidate tips; perennials ...ll. G. concinnum

kk. Leaves 0.3-1 cm long, with bristle-tips; annuals ... G. divaricatum

k. Leaves rounded or blunt at tip, without bristle-tips; leaves in whorls of 4, 5, or 6, or combinations of these... l

Galium divaricatum may also be known as G. parisiense var. leiocarpum or G. parisiense var. divaricatum elsewhere, but these also have not been reported for Missouri. C. L. Lawson is presently working on Galium species of eastern North America and she will be using G. parisiense for this taxon (pers. comm., 1982).

[1]Biology Dept., Central Missouri State University, Warrensburg, MO 64093

A voucher specimen, Castaner 5831, 25 June 1979, Henry County, Missouri, has been deposited in the herbaria of Central Missouri State University, Warrensburg, and Southwest Missouri State University, Springfield.

2. A New Hairgrass (Aira) in Missouri

Silver Hairgrass, Aira caryophyllea L., is reported here from Taney County. It was found growing among posts and benches with Sherardia arvensis L. (Field Madder), also a rare-to-Missouri species, in picnic area, Field #2, at Table Rock State Park. The obstructions may have protected the species from excessive trampling and/or grass cutting. It may have been introduced by campers or visitors from other regions as seeds on their clothes or on their vehicles, or perhaps as a contaminant of grass seed. Silver Hairgrass is a European species that has established itself in coastal sandy areas throughout the eastern United States and in parts of the Pacific Coast States (Shetler and Skog, 1978). It is apparently spreading throughout North America.

Aira elegans Willd., its closest relative in Missouri, is found only in St. Louis and Oregon Counties. The following key will characterize both species, separate them, and serve to bring the Flora of Missouri up to date. Refer to page 139 of the Flora of Missouri.

1. Both upper and lower florets awned; the silvery spikelets clustered towards the tips of the inflorescence ... A. caryophyllea

1. Only the upper lemma awned; the spikelets scattered at the tips of the inflorescence ... A. elegans

A voucher specimen, Castaner 1085, 25 June 1979, Taney County, Missouri, has been deposited in the herbarium of Central Missouri State University, Warrensburg.

Literature Cited

Shetler, S. G. and L. E. Skog. 1978. A Provisional Checklist of Species for FLORA NORTH AMERICA (revised). Published by Missouri Botanical Garden for MAB/FNA. pp. 199.

Steyermark, J. 1963. Flora of Missouri. Iowa State University Press. Ames, Iowa. pp. 1725.

Natural Area Inventory and Floristic Analysis of Fens in Selected Southeastern Missouri Counties: Part I

Steve L. Orzell

The following is a summary of my masters thesis research, which was a study to inventory, botanize, and classify fens (formerly calcareous wet meadows) of natural area significance from four southeastern Missouri counties: Reynolds, Madison, Shannon, and St. Francois. A fen is defined as a natural community of relatively firm, well decomposed, sapric, mucky peat or gravelly marl constantly saturated by cold calcareous groundwater at or just below the surface, and supporting a distinct calciphilous flora.

With the exception of some previous natural area surveys (Fadler & Elder, 1973; Karel, 1976; Kurz, 1981; Nelson, 1980; Walsh, 1976), fens remained largely undetected features of the Salem Plateau. A combination of survey techniques included aerial surveillance, examination of (ASCS) aerial photographs, (USGS) topographic quadrangles, (USDA-SCS) pedologic surveys, geologic surveys, hydrogeologic investigations, herbarium records, and interviews with local residents. All were evaluated and their effectiveness judged in developing an integrated systematic approach to locating fens.

Aerial surveillance was the most efficient tool. Late winter or ealy spring flights were most effective, when fens could be relatively easily spotted with some previous flight experience. Small seepage areas were more pronounced, not being obscured by leaf canopies of the surrounding forest. Seep-springs often appeared as darkened patches or emerald green due to Watercress (Nasturtium officinale R. Br.). Another aerial technique used to distinguish fens was the contrast exhibited by cool-season versus warm-season grasses. Native warm-season grasses were still dormant, whereas the exotic cool-season grasses cast a greenish hue. This variation was vital in discerning fens from fields converted to "improved" pastures.

Even in some old clearings, dominated by warm-season grasses, which might superficially resemble fen vegetation, one could employ certain flying tactics. The aircraft was tilted so as to give directed view of the site. If the area was a fen rather than an old field, a sparkling glare would be produced on a sunny day. This glare resulted from reflections of seep runs that appeared much pronounced as a result of reduced evapotranspiration rates in late winter.

Some species inhabiting fens could be identified from the air with experience. Distinctive growth forms, coloration, and other features of certain species were sometimes recognized from the plane. Dense green stands of Sweet Flag (Acorus calamus L.) were noticeable. Stunted wiry clumps of Alder (Alnus serrulata (Ait.) Willd.) usually signified a fen. Patchy whitened bark of Sycamore (Platanus occidentalis L.) along a fen border was striking against surrounding earthy tones. Young green stems of Willow (Salix) in crowded stands often identified a wetland. Tawny brown stalks of Cattails (Typha), although characteristic of a wide range of disturbed wetlands, were apparent when forming dense beds. Generally, fens appeared as dark-tone images with free surface water visible between relatively homogeneous colored graminoids.

In addition to recognition of new fen sites, the aerial survey provided for determination of artificial disturbance. Vegetation on heavily grazed fens appeared stunted or denuded due to foraging pressure. Ungrazed fens had a more vigorous, stratified appearance.

Tonal variation and uniformity (texture) were important criteria for detecting fens on (ASCS) aerial photos. Dark grey tones of irregular configuration usually denoted wet soils with sedge dominants. In contrast, agricultural areas, developments, bare areas, or excavations appeared as sharply whitened tones. As a general rule, lighter tones indicated well-drained soils and darker tones, poorly drained soils.

Uniformity or texture were also utilized to locate potential fen sites. A closely patterned or mottled texture usually indicated a fen site. This textural distinction is the result of a mosaic of fen plant communities. In contrast, old fields were lighter toned and characteristically harbored numerous small, scattered trees. Junipers, typical of old fields or well-drained substrates appeared dark and well defined.

A few fens displayed a peculiar splotched appearance. Prominent lightly colored blotches frequently were contrasted against a deep homogeneous gray tone. Later upon field examination, these fens were found to contain a series of mounds, possibly of archaeological significance.

Aerial photos were also useful in detecting disturbance. If a fen occurred within the confines of a sharply delineated field, it was suspected as pasture land. In some cases, livestock trails (thin, white lines), stock-trampled areas (white splotches with radiating lines), barns, feeding bunks, or even occasionally grazing animals could be seen on some photos. Rows of parallel lines usually indicated past cultivation attempts or mowing, induced by machinery. Even more noticeable were drainage ditches.

When a potential fen site was identified with a significant forest buffer, it usually proved to be little disturbed. A combination of various textured, dark tonal qualities and an irregular boundary were the best clues in locating fens on black and white prints.

Topographic maps of the 7.5 minute series quadrangles and 15 minute maps of the study area were examined. While 7.5 minute series quadrangles are generally precise in depicting wetlands, seepage associated with fens is never illustrated. Fens in the study area are too small to be represented by conventional wetland symbolism. Quadrangles were advantageous in detection of potential fen regions. They were less valuable in predicting precisely where new fens might be discovered during early phases of the study, prior to recognition of hydrogeologic parameters.

Initially, potential fen terrain was assessed from quadrangles by identifying valleys with permanent streams, irregular green-white (forest-openings) overlay, and the presence of springs. But this criterion had pitfalls. Perennial streams were not always represented on smaller critical tributaries. In a few situations, openings on a quadrangle represented fens. On others, even irregular shaped openings were later determined as old artificial clearings. Sometimes an isolated green patch in a field proved to be a fen; or, conversely, an isolated woodlot. Lastly, even though all fens have some kind of spring flow, not all springs harbor fens; thereby the mere presence of springs on a topo-map was not sufficient to discern whether fens might be present.

Once in the field, 7.5 minute quadrangles were rather useful for predicting new fen localities. The first step was to calculate the elevation of plotted fens on a given quadrangle. Secondly, through close scrutiny of other features (topographic position, valley width, stream order, slope relief), one could compile a list of similar features. Remaining valleys on that quadrangle could be scanned for similar conditions. Faulting, fracturing, jointing, and other geologic phenomena necessitated examination of each individual quadrangle.

Hydrogeologic modes of fen occurrences were of importance in further refining inventory methods and developed as the inventory progressed. Fens are predominantly located in upper reaches of gaining streams characteristic of deeply dissected basins where there is thick residuum derived from Potosi and/or Eminence Dolomite (Upper Cambrian strata) overlying uplands and valley sideslopes. Deeply weathered residuum derived from these dolomites is presumed acting as an unconsolidated aquifer and responsible for formation of seep-springs nurturing fens. Furthermore, gaining streams in watersheds of relatively small extent on first or second stream drainage orders were most productive.

Along interrupted streams, which are most pronounced in slightly dissected basins, fens were infrequent and restricted to gaining reaches. Losing reaches generally lack stream terraces, harbor subsurface conduits which drain surface waters, and have greater surface to groundwater depths, all detrimental to fen formation.

Topographic position, slope, valley width, and sensitivity to flooding were also important factors. Fens were encountered either at the toe of the slope or base of stream terraces located along the lateral valley walls. In some cases, fens occupied shallow depressions between colluvial slopes and alluvial soils. If fens occurred on side slopes, they were usually gently sloping but could in rare cases be steeply sloping. Hanging fens on steep slopes are the exception rather than the rule.

Valley width is of consequence as it relates to flood frequency. Broad valleys that are subject to backwater flooding immediately upstream from narrows or "shut-ins" rarely harbored fens. Major drainages with broad, flat floodplains and narrow bluff-lined corridors lacked fens, except along former stream terraces that are no longer subject to frequent floods. Extremely narrow valleys, subject to flash flooding, never produced fens. Valleys of medium width, with relatively small drainage areas and sustained base flow that rarely flooded, were most productive.

Compilation of available information accounted for 16% of all located fen sites. Herbarium label data were helpful in relocating fens where Steyermark had collected specimens. Soil and geologic map visibility depended primarily upon mapping scale and availability. Of particular value were leads given by area root diggers, timber cutters, and persons who harvest hay.

If the inventory would have relied solely on accumulating available information and literature sources, 84% of all the fens would have been missed. Nineteen new qualifying fens, 20 new notable fens, and 101 new nonqualifying fens would have been overlooked. This clearly demonstrates that new inventory methodology (examining topographic maps, aerial photos, aerial surveillance, and hydrogeologic criteria) is superior to previous inventory methods.

As fens were identified they were determined to be either (1) a qualifying fen natural area; (2) a notable fen; (3) a nonqualifying fen; or (4) a nonqualifying area without any fen. If a fen was qualifying, it had to meet one or more criteria (Table 1).

Notable fens are areas that do not meet any of the criteria established for the categories, usually due to their small size or degree of artificial disturbance. An example would be a high quality seep-fen only a few meters in circumference or an undisturbed fen with severe woody invasion. Notable areas are of considerable county level importance for research, interpretative value, or nature appreciation.

TABLE 1

NATURAL FEATURE CATEGORIES AND SIGNIFICANT FEATURES

Natural Feature Category	Significant Feature
I. Ecological areas	Relatively undisturbed natural community, reflecting as near as possible presettlement ecosystem. Other areas will be recognized if they are the least disturbed remnant of a particular natural community.
II. Rare and endangered species habitats	Sites with native flora designated as rare or endangered in Missouri, or proposed for federal listing.
III. Relict species habitats	Area is recognized if supporting relicts of a past climatic period.
IV. Natural study areas	Land managed and used as an example of a natural ecosystem for educational purposes or research. Included are dedicated Missouri Natural Areas.

Of the 166 fens that were discovered (Table 2), 28 were qualifying natural areas, 21 were notable fens, and 117 were nonqualifying fens.

TABLE 2

SURVEY RESULTS BY COUNTY

	STATUS			
County	Natural Area Fens	Notable Fens	Nonqualifying Fens	Total
Madison	1 (3%)	0 (0%)	15 (13%)	16 (10%)
Reynolds	15 (54%)	17 (81%)	71 (61%)	103 (62%)
Shannon	9 (32%)	3 (14%)	21 (18%)	33 (20%)
St. Francois	3 (11%)	1 (5%)	10 (8%)	14 (8%)
Total	26	21	117	166

Forty-two percent of the total number of natural features belong to category 1 (Table 3). Eight sites have examples of relatively undisturbed fens (Grade A), 16 sites have nearly undisturbed fens (Grade B), and 11 sites have been disturbed, but not beyond recovery (Grade C or D). Note that a site may have fens of several different grades.

TABLE 3

SUMMARY OF CATEGORIES BY COUNTY

County	I	II	III	IV	Total
Madison	1	0	1	0	2 (3%)
Reynolds	15	7	13	1	36 (54%)
Shannon	9	4	9	0	22 (33%)
St. Francois	3	1	3	1	7 (10%)
Total	28 (42%)	12 (17%)	26 (38%)	2 (3%)	67 (100%)

I - Ecological Area
II - Rare & Endangered Species Habitat
III - Relict Species Habitat
IV - Natural Study Area

Note that a fen may qualify under several categories.

Qualifying fen natural areas include 18 examples of sedge-shrub fens, 13 calcareous seep fens, 4 prairie fens, 4 calcareous seep-fed streams, 3 calcareous seep-forests, and 1 wet meadow. Calcareous seep-forests and prairie fens are isolated, rare occurrences and highly vulnerable to destruction. The low number of qualifying wet meadows illustrates that most investigated were not worthy of preservation due to either their ephemeral nature or low natural quality. Eleven species of plants are identified under category II. A total of 24 new stations were discovered for rare and endangered species in the study area. Twenty-four plant taxa are identified as displaying relictism (category III), and 16 plants are listed as notables.

Of particular significance are three sites R61, SH7, and SH26 identified by this inventory. R61 represents an extensive 5.6 ha (14 acre) prairie fen, a natural community previously undescribed in Missouri. This site is of statewide significance and possibly worthy of national landmark status. Within R61 there are examples of 3 calcareous seep fens, 9 sedge-shrub fens, 1 calcareous seep-forest, and 2 prairie fens. SH7 represents the only known example of a raised or domed fen known within Missouri. SH26 is an exceptional example of a hanging fen, extremely rare in the Ozarks.

Previous to this work, fens in the study area had not been systematically botanized. The botanical uniqueness, although commented on by Steyermark (1951a & b; 1955, 1963), was only briefly addressed (Steyermark, 1938, 1949, 1952) in notes reporting new state records. These accounts represented the extent of botanical knowledge. Documentation of the flora was accomplished by collecting voucher specimens, compiling an annotated catalogue of vascular plants, and conducting extensive field observations on phenology and natural community structure. Nomenclature and specimen indentification follows Steyermark (1963).

An annotated catalogue of 299 taxa representing 64 families, 178 genera, 292 species, 89 county records, and 1 state record was prepared. Six fen natural community types were described: calcareous seep fen, sedge-shrub fen, prairie fen, wet meadow, calcareous seep-forests, and calcareous seep-fed streams. Floristic results will be detailed in future articles.

At present, fen communities are poorly represented on the state natural areas register, and very few are preserved. Steps should be taken to ensure that these living Pleistocene museums are adequately protected as part of Missouri's natural heritage.

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Studies on the Fabricales, Part I

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Some years ago we published a brief communication concerning a group of plants known as the Plasticaceae (1). Recently the spread of a particular representative of this family in the midwestern United States has been noted (2 and 3). We feel that perhaps a further elucidation of the relationship of the plants to the mainstream of taxonomic botany is long overdue. To the best of our knowledge, no really systematic classification has been proposed. The group of plants constitutes a separate order which we propose to call the Fabricales. This order is characterized by three common traits:

1. Members are always found in association with a sophont in what may sometimes be a true mutualistic relationship, although more often the relationship is commensalistic.

2. Juvenile forms are rare.

3. Individual specimens tend to mimic common plants and to displace them from inhospitable niches.

Some representatives of the order are very old. In the ancient Egyptian manuscript The Book of the Dead (4) Isis is pictured holding a golden lotus blossum in her hand. This is clearly a specimen of the Metallaceae, Aureus pseudonelumbo. In the old Hebrew descriptions of Solomon's temple we find mention of other members of the Metallaceae:

> He also made two capitals of molten bronze, to set upon the tops of the pillars.... Likewise he made pomegranates; in two rows round about upon the one network, to cover the capital that was upon the top of the pillar; and he did the same with the other capital. Now the capitals that were upon the tops of the pillars in the vestibule were of lily-work, four cubits. The capitals were upon the two pillars and also above the rounded projection which was beside the network; there were two hundred pomegranates, in two rows round about; and so with the other capital. 1 Kings 7: 16, 18-20.

These are obviously early forms of Brunidium pseudopunica and B. pseudolilium.

The Fabricales may be subdivided into three distinct suborders depending on their origin. Probably the oldest suborder, yet showing recent rapid diversification, the Solidificales, have had a warm liquid phase in close association with a mold. Families belonging to the Solidificales include the Plasticaceae, which have been treated earlier (1), the Metallaceae mentioned above, and the Cereaceae or wax flowers.

In the second suborder, the Modificales, plant origin involved structural changes in pre-existing materials. Families include the Cellulosaceae, Fibroinaceae, Xylonaceae, Ceramicaceae, and Lithaceae (or Sculpturaceae).

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In the suborder Extrudosales, a particularly interesting family is found on the top of cakes used on festive occasions, the Polysaccharidaceae, with by far the most abundant species Sucrosa pseudorosa. It will be noted that the specific epithet pseudorosa is found within most of the Modificalean families, reflecting the popularity of all varieties of roses.

A few added comments on the more recent and very rapid spread of two species of Polyvinylensis are perhaps in order. First, Polyvinylensis pseudopoa, which has taken over many very large recreational and sports areas replacing the original natural turf. This has created a whole new industry for athletic shoe manufacturers, new uses for Zamboni machines, and new techniques for athletic performance on the field, as well as a few new and different injuries to athletes. The same P. pseudopoa, or Polyethylensis pseudopoa, or one of their varieties now appears on outdoor stairways, porches, patios, pool decks, and pool locker rooms.

The other species of Polyvinylensis, P. pseudopinus, along with P. pseudotaxus, P. pseudoabies and P. pseudopicea, is common year round outside of fast food restaurants and gas stations. However, one variety usually has a very seasonal appearance, although it does seem to become evident at an earlier date in the fall each year, frequently just after Halloween and definitely well before Thanksgiving. This species, P. pseudopinus-weinachtensis, is found in Holiday displays nearly everywhere from hardware stores to skating rinks, department stores and shopping centers to private homes -- certainly a very successful species -- and some are even scented!

It is clear that a little cooperative thought will reveal many other unnoticed Fabricalean types. We append a tentative partial classification and will attempt a monograph if a publisher can be found.

Order -- FABRICALES

Sub Order -- SOLIDIFICALES

Family -- METALLACEAE

Representative species: Aureus pseudonelumbo, Brunidium pseudopunica, B. pseudolilium, Argentum pseudochrysanthemum

Family -- CEREACEAE

Representative species: Parafinensis pseudoranunculus, P. pseudobegonia, Apiarinsis pseudoviola

Family -- PLASTICACEAE

Representative species: Polyvinylensis pseudophilodendron, P. pseudodieffenbachia, P. pseudopoa, Polyethylensis pseudohelianthus,

Sub Order -- MODIFICALES

Family -- CELLULOSACEAE

Representative species: Pulpa pseudoiris, P. pseudochrysanthemum, Crepensis pseudopapaver, Craftensis pseudonarcissus, Machee pseudorosa

Family -- FIBROINACEAE

Representative species: Seolca pseudorosa, S. pseudocattleya, S. pseudohemerocallis

Family -- XYLONACEAE

Representative species: Balsaca pseudoaster, Acersaccharus pseudotulipa, Juglansa pseudorosa

Family -- CERAMICACEAE

Representative species: Kaolin pseudorosa, Montmorillinite pseudochrysanthemum, M. pseudolilium

Family -- LITHACEAE (or SCULPTURACEAE)

Representative species: Dolomitecum pseudozeamays, Granitum pseudohelianthus, Marbeleatum pseudoquercus, Jadeicus pseudochrysanthemum

Sub Order -- EXTRUDOSALES

Family -- POLYSACCHARIDACEAE

Representative species: Sucrosa pseudorosa, S. pseudolathyrus

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Updated Address List

For your convenience, an address list of MONPS members is contained on the subsequent pages. Following the alphabetical list by name is one organized by address. This list should help in recognizing fellow members in your area. Please look over each list carefully and send any corrections to the Membership Chairman.